ATTACHMENT C
Amendments to the Claims

Please cancel claim 17 without prejudice or disclaimer.

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently Amended) A method of forming a grating structure in a photosensitive waveguide, the method comprising the steps of:

- dividing an input coherent beam into at least three coherent beams;
- transmitting the at least three coherent beams through respective optical ~~pathes~~ paths in a manner such that they interfere at a ~~first~~ predetermined position;
- placing the photosensitive waveguide at the predetermined position; and
- modulating/adjusting the relative phase and/or the intensity of at least one of the at least three coherent beams~~; and~~ so as to form the grating structure comprising superimposed gratings of different orders with respect to a certain wavelength at the predetermined position through refractive index changes induced in the photosensitive waveguide.

~~- placing a photosensitive waveguide at the predetermined position so as to form the grating structure comprising different order gratings super-imposed at the predetermined position through refractive index changes induced in the photosensitive waveguide.~~

2. (Original) A method as claimed in claim 1, wherein the step of dividing the input beam comprises diffraction of the input beam.

3. (Currently Amended) A method as claimed in claim 2, wherein the dividing of the input coherent beam into the at least three coherent beams utilizes a phasemask.

4. (Currently Amended) A method as claimed in claim 2, wherein the at least three coherent beams ~~are made up from~~ comprise two first order diffracted beams and one zero order diffracted beam.

5. (Previously Presented) A method as claimed in claim 1, wherein the dividing of the input coherent beam utilizes at least two mirrors of less than 100% reflection.

6. (Currently Amended) A method as claimed in claim 1, wherein the transmission along the optical ~~pathes~~ paths utilizes at least two ~~refractive~~ reflective elements for reflecting two of the beams so as to direct them to the predetermined position.

7. (Previously Presented) A method as claimed in claim 1, wherein the method further comprises the step of tuning a period of the resulting grating structure.

8. (Previously Presented) A method as claimed in claim 7, wherein the tuning of the period is effected through tilting of the or reflective elements utilized in the transmitting of the three coherent beams.

9. (Previously Presented) A method as claimed in claim 1, wherein the method comprises the step of tuning a shape of the resultant refractive index profile in the photosensitive waveguide.

10. (Currently Amended) A method as claimed in claim 9, wherein the tuning of the shape is effected by adjusting the relative intensities of the ~~interfering~~ at least three coherent beams.

11. (Currently Amended) A method as claimed in claim 1, wherein the method comprises the step of switching between the writing of the different order gratings.

12. (Currently Amended) A method as claimed in claim 11, wherein the switching is effected by selectively blocking out at least one of the at least three coherent beams.

13. (Currently Amended) A method of writing a grating structure in a photosensitive waveguide, the method comprising the steps of:

- dividing an input coherent beam into two nth order beams and a zero order beam utilizing a phase mask, wherein nth is equal to or greater than first;
- placing a photosensitive waveguide substantially adjacent a surface of the phase mask where the nth order beams and the zero order beam overlap;
- modulating/adjusting the intensity of the zero order beam transmitted by the phase mask such that a grating structure comprising ~~different order~~ superimposed

gratings ~~superimposed~~ of different orders with respect to a certain wavelength is created through refractive index changes induced in the photosensitive waveguide.

14. (Currently Amended) A method as claimed in claim 13, wherein the formed grating structure comprises a grating having a non-sinusoidal profile along a light propagation direction of the ~~wave guide~~ waveguide.

15. (Previously Presented) A method as claimed in claim 13, wherein the grating comprises a first order grating.

16. (Currently Amended) A method as claimed in claim 13, wherein the grating structure comprises a first order grating and a higher than first order grating.

17. (Canceled)

18. (Currently Amended) A method as claimed in ~~claim 17~~ claim 16, wherein the grating structure comprises a first and second order gratings superimposed.

19. (Currently Amended) An apparatus for writing a grating structure in a photosensitive waveguide, the apparatus comprising:

- means for dividing an input coherent light beam into at least three ~~cohere~~ coherent beams;

- an optical circuit for transmitting each of the at least three coherent beams to a predetermined position so as to form an interference pattern at the predetermined position; and

- means for modulating/adjusting the relative phase and/or the intensity of at least one of the at least three coherent beams; ~~and~~ for, in use, writing the grating structure comprising superimposed gratings of different orders with respect to a certain wavelength through refractive index changes induced in the photosensitive waveguide.

~~an optical circuit for transmitting each of the three coherent beams to a predetermined position so as to form an interference pattern at the first predetermined position for, in use, writing the grating structure comprising different order gratings super-imposed through refractive index changes induced in the photosensitive waveguide.~~

20. (Currently Amended) An apparatus as claimed in claim 19, wherein the apparatus comprises at least one modulation means for modulating/adjusting the phase and/or intensity of one of the at least three beams relative to the others.

21. (Currently Amended) An apparatus as claimed in claim 19, wherein the means for dividing the input beam comprises a diffraction ~~means~~ element.

22. (Currently Amended) An apparatus as claimed in claim 19, wherein the ~~three beams~~ at least three coherent beams comprise the zero order diffraction and two first order diffraction beams.

23. (Currently Amended) An optical ~~filter comprising~~ device comprising:

an optical filter comprising a grating structure written ~~in accordance with~~ using the method of claim 1.

24. (Currently Amended) ~~A~~ The filter ~~as claimed in~~ of claim 23, wherein second order modulation in the grating structure results, in use, in the emission of filtered light energy substantially perpendicular to a core axis of the waveguide.

25. (Currently Amended) ~~A~~ The filter ~~as claimed in~~ of claim 23, wherein the filter comprises a chirped second order grating which transmits predetermined wavelengths of light energy substantially perpendicular to a core axis of the waveguide and at predetermined positions along the waveguide.

26. (Currently Amended) ~~A~~ The filter ~~as claimed in~~ of claim 23, wherein the grating structure comprises a grating comprising a first order grating and the second order grating superimposed.

27. (Currently Amended) An optical device, said device comprising:

an optical free space coupler comprising a first grating structure written ~~in accordance with~~ using the method ~~as claimed in~~ of claim 1.

28. (Currently Amended) ~~A coupler a claimed in~~ The optical device of claim 27, wherein the first grating structure is formed within a first optical waveguide and is arranged to provide the emission of filtered light energy substantially perpendicular to a core axis of the first waveguide; and a second grating structure formed within a second optical waveguide placed in the path of emission of the filtered light energy can couple a portion of the filtered light energy along the second optical waveguide, and wherein at least one of the first or second grating structures comprises a second order grating.

29. (Currently Amended) ~~A coupler as claimed in claim 28,~~ The optical device of claim 28 wherein at least one of the first or second grating structures comprises a first order grating and a second order grating superimposed.

30. (Currently Amended) An optical device comprising:

an optical sensor comprising a grating structure written ~~in accordance with~~ using the method ~~as claimed in~~ of claim 1.

31. (Currently Amended) ~~A sensor as claimed in~~ The optical device of claim 30, wherein the grating structure comprises a second order grating formed within an optical waveguide, the grating structure having a predetermined second order modulation so as to provide for the reciprocal emission o optical energy substantially perpendicular to the optical waveguide; the sensor further comprising an optically sensitive material spaced adjacent to the optical waveguide, the material having optical reflective properties

variable in accordance with an external physical parameter, the material reflecting the emitted optical energy from the grating structure back to the grating structure.

32. (Currently Amended) ~~A sensor as claimed in~~ The optical device of claim 30, wherein the grating structure comprises a first order grating and the second order grating.

33. (Currently Amended) ~~A grating structure~~ An optical device comprising:

an optical fiber having a grating structure written ~~in accordance with~~ using the method ~~as claimed in~~ of claim 1 ~~into an optical fiber~~.

34. (Currently Amended) A device comprising:

an optical device for suppressing ripples in a dispersion compensator in an optical fiber, the optical device comprising a grating structure written ~~in accordance with a~~ using the method ~~as claimed in claim 1 for~~ of claim 1, said optical device providing for an optical loss mechanism to effect the suppressing of the ripples.

35. (Currently Amended) ~~A~~ The device ~~as claimed in~~ of claim 34, wherein the grating structure comprises a second order grating.

36. (Currently Amended) ~~A~~ The device ~~as claimed in~~ of claim 33, wherein the grating structure comprises a first order grating and a second order grating superimposed.

37. (Currently Amended) ~~A~~ An optical device comprising:

a dispersion compensator for compensating dispersion in an optical fiber, the compensator comprising a grating structure written ~~in accordance with a~~ using the method ~~as claimed in claim 1 for~~ of claim 1, said compensator providing an optical loss mechanism for suppressing ripples.

38. (Currently Amended) ~~A compensator is claimed in~~ The optical device of claim 37, wherein the grating structure comprises a higher than zero order grating.

39. (Currently Amended) ~~A compensator as claimed in claims 37,~~ The optical device of claim 37, wherein the grating structure comprises a second order grating.

40. (Currently Amended) ~~A compensator a claimed in~~ The optical device of claim 37, wherein the grating structure comprises a first order grating and a second order grating superimposed.

41. (New) The optical device of claim 37, wherein the grating structure comprises a higher than first order grating.